

CLAIMS

What is claimed is:

1. A polypeptide comprising an amino acid sequence of Formula I.
2. The polypeptide of claim 1 where said amino acid sequence is the sequence set forth in the Sequence Listing as SEQ ID NO:2.
3. The polypeptide of claim 1 where said amino acid sequence is the sequence set forth in the Sequence Listing as SEQ ID NO:4.
4. The polypeptide of claim 1 where said amino acid sequence is the sequence set forth in the Sequence Listing as SEQ ID NO:15.
5. A polypeptide selected from the group consisting of: (a) a polypeptide encoded by a nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:1, or a complement thereof, (b) a polypeptide encoded by a nucleic acid molecule comprising a sequence that is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:1, or a complement thereof, and (c) a naturally occurring allelic variant of a polypeptide comprising the sequence set forth in the Sequence Listing as SEQ ID NO:2 or an amino acid sequence encoded by the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 40925, or a complement thereof, wherein the polypeptide is encoded by a nucleic acid molecule that hybridizes under stringent conditions to the complement of a nucleic acid molecule consisting of the nucleotide sequence set forth in the Sequence Listing as SEQ ID NO:1.
6. A polypeptide selected from the group consisting of: (a) a polypeptide encoded by a nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:3, or a complement thereof, (b) a polypeptide encoded by a nucleic acid molecule comprising a sequence that is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:3, or a complement thereof, and (c) a naturally occurring allelic variant of a polypeptide comprising the sequence set forth in the Sequence Listing as SEQ ID NO:4 or an amino acid sequence encoded by the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 40926, or a complement thereof, wherein the polypeptide is encoded by a nucleic acid molecule that hybridizes under stringent conditions to the complement of a nucleic acid molecule consisting of the nucleotide sequence set forth in the Sequence Listing as SEQ ID NO:3.

7. A polypeptide selected from the group consisting of: (a) a polypeptide encoded by a nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:14, or a complement thereof, (b) a polypeptide encoded by a nucleic acid molecule comprising a sequence that is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:14, or a complement thereof, and (c) a naturally occurring allelic variant of a polypeptide comprising the sequence set forth in the Sequence Listing as SEQ ID NO:15 or an amino acid sequence encoded by the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 41007, or a complement thereof, wherein the polypeptide is encoded by a nucleic acid molecule that hybridizes under stringent conditions to the complement of a nucleic acid molecule consisting of the nucleotide sequence set forth in the Sequence Listing as SEQ ID NO:14.
8. A polypeptide of claim 1 further comprising a heterologous amino acid sequence.
9. A polypeptide of claim 2 further comprising a heterologous amino acid sequence.
10. A polypeptide of claim 3 further comprising a heterologous amino acid sequence.
11. A polypeptide of claim 4 further comprising a heterologous amino acid sequence.
12. An antibody that selectively binds to said polypeptide of claim 1.
13. An antibody that selectively binds to said polypeptide of claim 2.
14. An antibody that selectively binds to said polypeptide of claim 3.
15. An antibody that selectively binds to said polypeptide of claim 4.
16. An antibody that selectively binds to said polypeptide of claim 5.
17. An antibody that selectively binds to said polypeptide of claim 6.
18. An antibody that selectively binds to said polypeptide of claim 7.
19. An antibody that binds to a peptide of said polypeptide of claim 1 where said peptide renders said antibody selective for said polypeptide.
20. A nucleic acid molecule that encodes said polypeptide of claim 1.
21. A nucleic acid molecule that encodes said polypeptide of claim 2.
22. A nucleic acid molecule of claim 21 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:1.

23. A nucleic acid molecule that encodes said polypeptide of claim 3.

24. A nucleic acid molecule of claim 23 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:3.

25. A nucleic acid molecule that encodes said polypeptide of claim 4.

26. A nucleic acid molecule of claim 25 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:14.

27. A nucleic acid molecule selected from the group consisting of: (a) a nucleic acid molecule comprising a nucleotide sequence which is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:1, or a complement thereof, (b) a nucleic acid molecule comprising a nucleotide sequence that hybridizes to a nucleic acid molecule consisting of the sequence set forth in the Sequence Listing as SEQ ID NO:1 under stringent conditions, or a complement thereof, and (c) a nucleic acid molecule comprising a nucleotide sequence that hybridizes under stringent conditions to a nucleic acid molecule consisting of the nucleotide sequence of the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 40925 or a complement thereof.

28. A nucleic acid molecule selected from the group consisting of: (a) a nucleic acid molecule comprising a nucleotide sequence which is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:3, or a complement thereof, (b) a nucleic acid molecule comprising a nucleotide sequence that hybridizes to a nucleic acid molecule consisting of the sequence set forth in the Sequence Listing as SEQ ID NO:3 under stringent conditions, or a complement thereof, and (c) a nucleic acid molecule comprising a nucleotide sequence that hybridizes under stringent conditions to a nucleic acid molecule consisting of the nucleotide sequence of the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 40926 or a complement thereof.

29. A nucleic acid molecule selected from the group consisting of: (a) a nucleic acid molecule comprising a nucleotide sequence which is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:14, or a complement thereof, (b) a nucleic acid molecule comprising a nucleotide sequence that hybridizes to a nucleic acid molecule consisting of the sequence set forth in the Sequence Listing as SEQ ID NO:14 under stringent conditions, or a complement thereof, and (c) a nucleic acid molecule comprising a nucleotide sequence that hybridizes under stringent conditions to a nucleic acid molecule consisting of the

nucleotide sequence of the cDNA insert of a plasmid deposited with the NCIMB as
10 Accession Number NCIMB 41007 or a complement thereof.

30. A nucleic acid molecule selected from the group consisting of (a) a
nucleic acid molecule comprising the sequence set forth in the Sequence Listing as
SEQ ID NO:1, (b) a nucleic acid molecule comprising said sequence set forth in the
Sequence Listing as SEQ ID NO:1 wherein the "t"s are replaced with "u"s, and (c) a
5 nucleic acid molecule that is complementary to (a) or (b).

31. A nucleic acid molecule selected from the group consisting of (a) a
nucleic acid molecule comprising the sequence set forth in the Sequence Listing as
SEQ ID NO:3, (b) a nucleic acid molecule comprising said sequence set forth in the
Sequence Listing as SEQ ID NO:3 wherein the "t"s are replaced with "u"s, and (c) a
5 nucleic acid molecule that is complementary to (a) or (b).

32. A nucleic acid molecule selected from the group consisting of (a) a
nucleic acid molecule comprising the sequence set forth in the Sequence Listing as
SEQ ID NO:14, (b) a nucleic acid molecule comprising said sequence set forth in the
Sequence Listing as SEQ ID NO:14 wherein the "t"s are replaced with "u"s, and (c) a
5 nucleic acid molecule that is complementary to (a) or (b).

33. A nucleic acid molecule of claim **20** further comprising a vector nucleic
acid sequence.

34. A nucleic acid molecule of claim **21** further comprising a vector nucleic
acid sequence.

35. A nucleic acid molecule of claim **23** further comprising a vector nucleic
acid sequence.

36. A nucleic acid molecule of claim **25** further comprising a vector nucleic
acid sequence.

37. A nucleic acid molecule of claim **20** further comprising a nucleic acid
sequence encoding a heterologous polypeptide.

38. A nucleic acid molecule of claim **21** further comprising a nucleic acid
sequence encoding a heterologous polypeptide.

39. A nucleic acid molecule of claim **23** further comprising a nucleic acid
sequence encoding a heterologous polypeptide.

40. A nucleic acid molecule of claim **25** further comprising a nucleic acid
sequence encoding a heterologous polypeptide.

41. A host cell comprising said nucleic acid molecule of claim 20.
42. A host cell comprising said nucleic acid molecule of claim 21.
43. A host cell comprising said nucleic acid molecule of claim 23.
44. A host cell comprising said nucleic acid molecule of claim 25.
45. A host cell of claim 41 wherein said cell is a mammalian host cell.
46. A host cell of claim 42 wherein said cell is a mammalian host cell.
47. A host cell of claim 43 wherein said cell is a mammalian host cell.
48. A host cell of claim 44 wherein said cell is a mammalian host cell.
49. A host cell of claim 41 wherein said cell is a non-mammalian host cell.
50. A host cell of claim 42 wherein said cell is a non-mammalian host cell.
51. A host cell of claim 43 wherein said cell is a non-mammalian host cell.
52. A host cell of claim 44 wherein said cell is a non-mammalian host cell.
53. A method of producing a polypeptide comprising: culturing said host cell of claim 41 under conditions in which said nucleic acid molecule is expressed.
54. A method for producing a polypeptide comprising: culturing said host cell of claim 42 under conditions in which said nucleic acid molecule is expressed.
55. A method for producing a polypeptide comprising: culturing said host cell of claim 43 under conditions in which said nucleic acid molecule is expressed.
56. A method for producing a polypeptide comprising: culturing said host cell of claim 44 under conditions in which said nucleic acid molecule is expressed.
57. An assay method for identifying an agent that can affect PDE11 activity or expression, comprising: contacting an agent with a polypeptide comprising an amino acid sequence of Formula I or a nucleotide sequence that encodes said polypeptide, and measuring the activity or expression of said PDE11, wherein a
5 difference between said PDE11 activity or expression in the absence of the agent and in the presence of the agent is indicative that the agent can affect said PDE11 activity or expression.
58. An assay method of claim 57 wherein said identified agent is useful in the treatment of sexual dysfunction in a mammal.
59. An assay method of claim 58 wherein said mammal is a male.
60. An assay method of claim 58 wherein said mammal is a female.
61. An assay method of claim 57 wherein said identified agent is useful in the treatment of a disease or condition affecting the striatum region of the brain.

62. An assay method of claim **57** wherein said identified agent is useful in the treatment of a disease or condition affecting ganglia cells of the esophageal sphincter.

63. An assay method of claim **57** wherein said identified agent is useful in the treatment of a disease or condition affecting endothelial cells within vessels of the corpus cavernosum.

64. A method of treating a disease or condition mediated by PDE11 in a mammal comprising administering to said mammal an effective treating amount of an agent identified using said assay method of claim **57**.

65. A method of treating sexual dysfunction in a mammal comprising administering to said mammal an effective treating amount of an agent identified using said assay method of claim **58**.

66. A method of claim **65** where said sexual dysfunction is erectile dysfunction.

67. A method of affecting PDE11 activity or expression in a mammal in need of said affecting comprising administering to said mammal a PDE11 activity or expression affecting amount of an agent identified using the assay method of claim **57**.

68. A method of mediating PDE11 expression in a mammal in need of said mediating comprising administering to said mammal a PDE11 expression mediating amount of a nucleic acid molecule of claim **20**.

69. A method of claim **68** where said nucleic acid molecule comprises the sequence set forth in the Sequence Listing as SEQ ID NO:1 or SEQ ID NO:3.

70. A method of mediating PDE11 activity in a mammal in need thereof comprising administering to said mammal a PDE11 activity mediating amount an antibody of claim **12**.

71. A method of claim **70** where said antibody selectively binds to a polypeptide which comprises the sequence set forth in the Sequence Listing as SEQ ID NO:2 or SEQ ID NO:4.

72. A pharmaceutical composition comprising a polypeptide comprising an amino acid sequence of Formula I, and a pharmaceutically acceptable carrier, vehicle or diluent.

73. A pharmaceutical composition of claim **72** wherein said sequence is selected from the group consisting of the sequences set forth in the Sequence Listing as SEQ ID NO:2, SEQ ID NO:4 and SEQ ID NO:15.

74. A pharmaceutical composition comprising a nucleic acid molecule comprising a nucleotide sequence that encodes an amino acid sequence of Formula I, and a pharmaceutically acceptable carrier, vehicle or diluent.

75. A pharmaceutical composition of claim **74** wherein said sequence is selected from the group consisting of the sequences set forth in the Sequence Listing as SEQ ID NO:1, SEQ ID NO:3 and SEQ ID NO:14.

76. A polypeptide capable of having an immunological reaction with said antibody of claim **12**.

77. A PDE11 inhibitor where said PDE11 comprises an amino acid sequence of Formula I.

78. A PDE11 inhibitor of claim **77** comprising an antibody which selectively binds to said PDE11.

79. A PDE11 inhibitor of claim **77** comprising (a) a ribozyme, or (b) a nucleic acid molecule selected from the group consisting of (1) a nucleic acid molecule comprising a nucleotide sequence which is at least about 75% identical to the sequence set forth in the Sequence Listing as SEQ ID NO:1, SEQ ID NO:3, or SEQ ID NO: 14, or a complement thereof, (2) a nucleic acid molecule comprising a nucleotide sequence that hybridizes to a nucleic acid molecule consisting of the sequence set forth in the Sequence Listing as SEQ ID NO:1, SEQ ID NO:3, or SEQ ID NO:14, under stringent conditions, or a complement thereof, and (3) a nucleic acid molecule comprising a nucleotide sequence that hybridizes under stringent conditions to a nucleic acid molecule consisting of the nucleotide sequence of the cDNA insert of a plasmid deposited with the NCIMB as Accession Number NCIMB 40925, 40926 or 41007, or a complement thereof.

80. A recombinant PDE11 enzyme where said PDE11 comprises an amino acid sequence of Formula I.

81. A recombinant nucleotide sequence encoding a PDE11 enzyme where said sequence comprises a nucleic acid molecule that encodes an amino acid sequence of Formula I.

82. *Escherichia coli* NCIMB 40925.

83. *Escherichia coli* NCIMB 40926.

84. *Escherichia coli* NCIMB 41007.
85. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:6.
86. A peptide encoded by said sequence of claim 85.
87. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:7.
88. A peptide encoded by said sequence of claim 87.
89. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:10.
90. A peptide encoded by said sequence of claim 89.
91. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:11.
92. A peptide encoded by said sequence of claim 91.
93. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:12.
94. A polypeptide encoded by said sequence of claim 93.
95. A polypeptide of claim 94 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:13.
96. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:16.
97. A polypeptide encoded by said sequence of claim 96.
98. A polypeptide of claim 97 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:17.
99. A nucleic acid molecule comprising the sequence set forth in the Sequence Listing as SEQ ID NO:18.
100. A polypeptide encoded by said sequence of claim 99.
101. A polypeptide of claim 100 comprising the sequence set forth in the Sequence Listing as SEQ ID NO:19.
102. An antibody that selectively binds to said peptide of claim 86.
103. An antibody that selectively binds to said peptide of claim 88.
104. An antibody that selectively binds to said peptide of claim 90.
105. An antibody that selectively binds to said peptide of claim 92.
106. An antibody that selectively binds to said peptide of claim 94.

- 107. An antibody that selectively binds to said peptide of claim **95**.
- 108. An antibody that selectively binds to said peptide of claim **97**.
- 109. An antibody that selectively binds to said peptide of claim **98**.
- 110. An antibody that selectively binds to said peptide of claim **100**.
- 111. An antibody that selectively binds to said peptide of claim **101**.